

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Brij Bahadur Agrawal, et al.

Serial No.: 09/804,993

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Group Art Unit 1764

Examiner: James Arnold Jr.

For: PROCESS FOR THE FIXED BED SWEETENING OF PETROLEUM  
DISTILLATES USING HALOGENATED METAL PHTHALOCYANINE AS A  
CATALYST

Attorney Docket No. U-013307-3

**RESPONSE UNDER 37 CFR 1.116**  
**- EXPEDITED PROCEDURE -**  
**EXAMINING GROUP 1642**

Commissioner for Patents  
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**Listing of Claims**

1. (currently amended)

A process for fixed bed sweetening of petroleum distillates using a dichloro- or dibromo- cobalt or iron halogenated metal phthalocyanine as a catalyst which comprises impregnating the catalyst on an activated charcoal bed by circulating an alcoholic alkaline solution of the catalyst through said activated charcoal bed until a colourless solution is obtained in the effluent, thereby obtaining a catalyst impregnated charcoal bed, passing the petroleum distillate through said catalyst impregnated charcoal bed along with air or oxygen at a temperature in the range 20°C to 100°C at a pressure in the range 1 kg/cm<sup>2</sup> to 15 kg/cm<sup>2</sup> with a liquid hourly space velocity in the range 1 hr<sup>-1</sup> to 15 hr<sup>-1</sup> with continuous or intermittent injection of alkali solution of concentration in the range 0.5 - 20%, to obtain the desired low mercaptan level petroleum distillates

2. (Previously presented)

A process as claimed in claim 1, wherein the alcoholic alkaline solution used is selected from methanolic and ethanolic solution of sodium hydroxide.

3 (currently amended)

A process as claimed in claim 1 wherein said halogenated metal phthalocyanine catalyst used is selected from dichloro cobalt phthalocyanine and dibromo cobalt phthalocyanine.

4. (currently amended)

A process as claimed in claimed in claim1 wherein the concentration of catalyst used in the fixed bed is in the range 0.1 wt% to 1 wt% of activated charcoal.

5 (currently amended)

A process as claimed in claim 1, wherein the halogenated metal said dichloro- or dibromo- cobalt or iron halogenated metal phthalocyanine is prepared by treating the cobalt or iron

phthalocyanine with a halogenating agent selected from the group comprising chlorine, bromine, iodine, thionyl chloride, sulphuryl chloride, phosphorus pentachloride, phosphorus oxychloride, phosphorus pentabromide and phosphorus trichloride.

- 6 (Previously presented) A process as claimed in claim 1, wherein the petroleum distillate used is selected from diesel, kerosine and FCC gasoline.
- 7 (Previously presented) A process as claimed in claim 1 wherein the temperature is about in the range 20°C to 50°C.
- 8 (Previously presented) A process as claimed in claim 1, wherein the pressure is about in the range 5 kg/cm<sup>2</sup> - 8 kg/cm<sup>2</sup>.
- 9 (Previously presented) A process as claimed in claim 1, wherein the liquid hourly space velocity (LHSV) is about in the range 1hr<sup>-1</sup> to 6hr<sup>-1</sup>.
- 10 (Previously presented) A process as claimed in claim 2, wherein said halogenated metal phthalocyanine catalyst used is selected from dichloro cobalt phthalocyanine and dibromo cobalt phthalocyanine.
- 11.(Previously presented) A process as claimed in claim 2, wherein the concentration of catalyst used in the fixed bed is in the range 0.1 wt% to 1 wt% of activated charcoal.
- 12.(Previously presented) A process as claimed in claim 3, wherein the concentration of catalyst used in the fixed bed is in the range 0.1 wt% to 1 wt% of activated charcoal.
13. (Currently amended) A process as claimed in claim 2, wherein the halogenated metal

said dichloro- or dibromo- cobalt or iron halogenated metal phthalocyanine is prepared by treating the cobalt or iron phthalocyanine with a halogenating agent selected from the group comprising chlorine, bromine, iodine, thionyl chloride, sulphuryl chloride, phosphorus pentachloride, phosphorus oxychloride, phosphorus pentabromide and phosphorus trichloride.

## 14 (Currently amended)

A process as claimed in claim 3, wherein the halogenated metal said dichloro- or dibromo- cobalt or iron halogenated metal phthalocyanine is prepared by treating the cobalt or iron phthalocyanine with a halogenating agent selected from the group comprising chlorine, bromine, iodine, thionyl chloride, sulphuryl chloride, phosphorus pentachloride, phosphorus oxychloride, phosphorus pentabromide and phosphorus trichloride.

## 15 (Currently amended)

A process as claimed in claim 4, wherein the halogenated metal said dichloro- or dibromo- cobalt or iron halogenated metal phthalocyanine is prepared by treating the cobalt or iron phthalocyanine with a halogenating agent selected from the group comprising chlorine, bromine, iodine, thionyl chloride, sulphuryl chloride, phosphorus pentachloride, phosphorus oxychloride, phosphorus pentabromide and phosphorus trichloride.

## 16. (Previously presented)

A process as claimed in claim 2, wherein the petroleum distillate used is selected from diesel, kerosine and FCC gasoline.

## 17 (Previously presented)

A process as claimed in claim 2, wherein the petroleum distillate used is diesel.

- 18 (Previously presented) A process as claimed in claim 2, wherein the petroleum distillate used is FCC gasoline.
- 19 (Cancelled)
- 20 (Cancelled)
- 21 (Previously presented) A process according to claim 1, wherein said injected alkali solution comprises sodium hydroxide.
- 22 (New) A process as claimed in claim 1 wherein said dichloro- or dibromo- cobalt or iron phthalocyanine is unsulfonated.
- 23 (New) A process as claimed in claim 1 wherein said dichloro- or dibromo- cobalt or iron phthalocyanine is insoluble in alkali or hydrocarbon during the sweetening process.